

**EKx-30**

DUAL EXPONENTIAL OR LINEAR VOLTAGE CONTROLLED AMPLIFIERS

SPECIFICATIONS

POWER REQUIRED:	+15v. @ 10 ma. -15v. @ 10 ma.
FREQUENCY RESPONSE:	DC to 20 kHz. nominal
EXPONENTIAL CONTROL SCALE:	10 dB/volt
MAX. SIGNAL LEVEL:	20v. p-p
CONTROL VOLTAGE RANGE:	-3v. to 12v.

The EKx-30 Dual VCA Experimenter's kit is a typical application of the CEM 3330 Voltage Controlled Amplifier Integrated Circuit. Support circuitry has been added to allow the device to respond to positive going control voltages by increasing its signal gain. The EKx-30 provides both AC and DC coupled signal inputs allowing it to be used either as a voltage controlled attenuator for audio signals or as an exponential multiplier for control voltages. Both a linear control voltage input and a pair of summing exponential control voltage inputs are provided for each of the amplifier sections. Though most applications will not require them, facilities have been provided for trimming of control voltage feed-through and distortion.

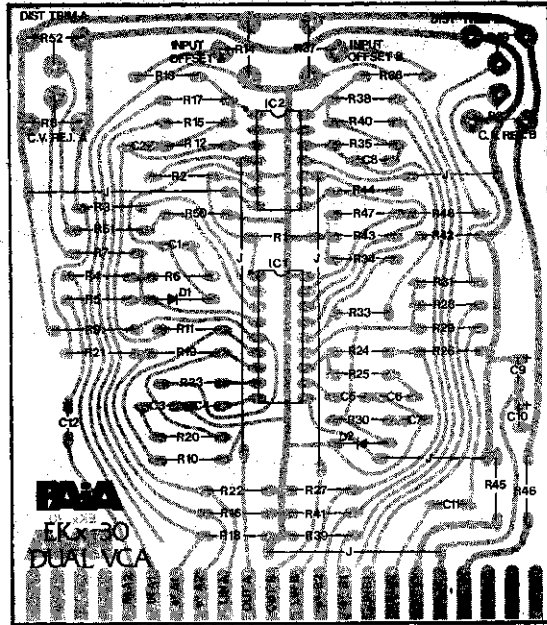
PARTS LIST

1 - CEM 3330	6 - 1000 ohm resistor (brown-black-red)
1 - 14 Pin DIP Socket	20 - 100K ohm resistor (brown-black-yellow)
1 - 4136 Op Amp	4 - 10K trimmer
1 - 18 Pin DIP Socket	2 - 100K trimmer
1 - 680 ohm resistor (blue-grey-brown)	2 - 100 pf. disc capacitor
2 - 4700 ohm resistor (yellow-violet-red)	2 - 470 pf. disc capacitor
2 - 5600 ohm resistor (green-blue-red)	4 - .01 mfd. disc capacitor
2 - 56K ohm resistor (green-blue-orange)	2 - 0.1 mylar capacitor
2 - 33K ohm resistor (orange-orange-orange)	2 - 33 mfd. 16v. electrolytic capacitor
3 - 10K ohm resistor (brown-black-orange)	2 - 1N914 diodes
4 - 150K ohm resistor (brown-green-yellow)	1 - 18 inch length of bare wire
4 - 100 ohm resistor (brown-black-brown)	1 - 4 inch length of small clear plastic tubing
	1 - EKx-30 Circuit Board

ASSEMBLY

As mentioned in the PAIA Technical Services note which accompanies the Curtis Chips, care during assembly is essential to fully realize the wide operating range possible from these state-of-the-art devices. CLEAN the circuit board thoroughly with steel wool or Scotch Brite pads prior to assembly a clean board is essential for proper solder adhesion. When assembly is complete, clean all rosin left over from soldering from the board using Acetone, denatured alcohol or some similar solvent.

Following the parts placement diagram to the right and the designators printed on the circuit board, install the components.



FIXED RESISTORS

DESIGNATION	VALUE	COLOR CODE A-B-C
() R1	4700 ohm	yellow-violet-red
() R2	56K	green-blue-orange
() R3	150K	brown-green-yellow
() R4	100K	brown-black-yellow
() R5	100K	brown-black-yellow
() R6	1000 ohm	brown-black-red
() R7	100K	brown-black-yellow
() R9	680 ohm	blue-grey-brown)
() R10	1000 ohm	brown-black-red
() R11	33K	orange-orange-orange
() R12	100K	brown-black-yellow
() R13	100K	brown-black-yellow
() R15	100K	brown-black-yellow
() R16	100K	brown-black-yellow
() R17	100K	brown-black-yellow
() R18	100K	brown-black-yellow
() R19	100K	brown-black-yellow
() R20	1000 ohm	brown-black-red
() R21	5600 ohm	green-blue-red
() R22	10K	brown-black-orange

()	R23	10K	brown-black-orange
()	R24	100K	brown-black-yellow
()	R25	1000 ohm	brown-black-red
()	R26	5600 ohm	green-blue-red
()	R27	10K	brown-black-orange
()	R28	100K	brown-black-yellow
()	R29	100K	brown-black-yellow
()	R30	1000 ohm	brown-black-red
()	R31	100K	brown-black-yellow
()	R33	33K	orange-orange-orange
()	R34	1000 ohm	brown-black-red
()	R35	100K	brown-black-yellow
()	R36	100K	brown-black-yellow
()	R38	100K	brown-black-yellow
()	R39	100K	brown-black-yellow
()	R40	100K	brown-black-yellow
()	R41	100K	brown-black-yellow
()	R42	150K	brown-green-yellow
()	R43	4700 ohm	yellow-violet-red
()	R44	56K	green-blue-orange
()	R45	100 ohm	brown-black-brown
()	R46	100 ohm	brown-black-brown
()	R47	100 ohm	brown-black-brown
()	R48	150K	brown-green-yellow
()	R50	100 ohm	brown-black-brown
()	R51	150K	brown-green-yellow

CAPACITORS

DESIGNATION	VALUE
() C1	.01 mfd. disc
() C2	470 pf. disc (may be 500 pf in some kits)
() C3	.01 mfd. disc
() C4	100 pf. disc
() C5	100 pf. disc
() C6	.01 mfd. disc
() C7	.01 mfd. disc
() C8	470 pf disc (may be 500 pf)
() C9	33 mfd. 16v. (or greater) electrolytic
() C10	33 mfd. 16v. (or greater) electrolytic
() C11	0.1 mfd. mylar
() C12	0.1 mfd. mylar

DIODES

DESIGNATION	TYPE
() D1	1N914 (or equivalent)
() D2	1N914 (or equivalent)

MISCELLANEOUS

- () Install the 18 pin DIP socket at IC1 (note polarity indicating notch)
- () Install the 14 pin DIP socket at IC2 (note polarity indicating notch)
- () Using the bare wire provided, form and install the 6 jumpers indicated by the solid lines broken with the letter "J". NOTE that the two jumpers running on either side of IC1 and IC2 should be covered with an appropriate length of the plastic insulation provided to prevent accidental short circuits between the jumper and resistor leads close to them.

Install the trimmer resistors

DESIGNATION	VALUE
() R8	10K Trimmer resistor (C. V. Rej. trim A)
() R14	10K Trimmer resistor (input offset A)
() R32	10K Trimmer resistor (C. V. Rej. trim B)
() R37	10K Trimmer resistor (input offset B)

Install the following two trimmers only if you will be using the distortion trim feature

- () R49 100K Trimmer resistor (Dist. trim B)
- () R52 100K Trimmer resistor (Dist. trim A)

INTEGRATED CIRCUITS

- () Install the CEM 3330 chip in the 18 pin DIP socket at IC1, observe polarization markings.
- () Install the 4136 Quad Op-Amp in the 14 pin DIP socket at IC2, observe polarization.

THIS COMPLETES ASSEMBLY OF THE EKx-30 DUAL VCA EXPERIMENTER'S KIT

CALIBRATION

Apply power to the supply pins on the EKx-30 card, +15v. to card connector pin 17, -15v. to connector pin 19 and the common ground of the two supplies to pin 18.

INPUT OFFSET

The input offset trimmers (R14 & R37) are used to set the gains of each of the VCA sections for a given control voltage input.

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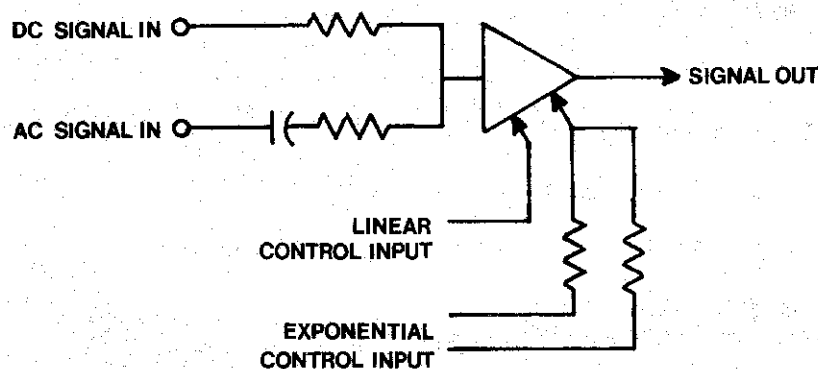
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USING THE EKX-30

Each of the two VCA sections that constitute the EKx-30 has this form:



DC SIGNAL IN - This is a direct coupled input to the VCA. A DC voltage applied to this input will appear as an inverted DC level at the output. The output level is controlled by both the linear and exponential control inputs.

Maximum design input voltage is $\pm 10v$. Input impedance is 50K ohms.

This input should not be used for audio inputs unless you are sure that the waveform has no DC component, otherwise fast envelope transients applied to the control inputs will produce thumps as the DC offset is amplified.

AC SIGNAL IN - Identical to DC SIGNAL IN except that coupling capacitor has been added to the circuit to remove DC offsets.

SIGNAL OUT - This is the variable gain output of the VCA. Output impedance is less than 100 ohms.

LINEAR CONTROL - This input provides linear voltage control of the amplifier. In most cases, this input will not be used. If it is used, the output impedance of the driving source should be low compared to the approximately 5K ohm impedance of this input.

EXPONENTIAL CONTROL - These two control inputs will be the ones most frequently used in audio or music synthesis work. Nominal control scale is 10dB/volt with unity gain corresponding to a total of 10 volts applied to the inputs.

SCHEMATIC

